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Use of Different Selection Methods in Nursing Education and other Healthcare Professions.

A Literature Review

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<p>Student selection methods administered in nursing schools and other healthcare professions, play a major role in determining graduating students or those that fall out of these programs before completion. The purpose of this study was to outline the currently used student selection methods in nursing education and other healthcare professions and identify any existing relationship between these methods and education outcomes.</p> <p>Databases used in this final project included; CINAHL, PubMed, ERIC and manual searches. 17 articles were extracted for analysis by applying Burnard's analysis method. Thereafter, the results were divided into three sections namely; current student selection methods in nursing education, current selection methods in other healthcare professions and the relationships between these methods and education outcomes.</p> <p>The findings in this final project outlines GPA as the most recurring student selection method in nursing and other healthcare professions. Other methods discussed include Multiple Mini Interview, Assessment centers, standardized preadmission tests both in nursing and other healthcare professions, personal interview among others. Relationships between these methods and education outcomes have also been covered.</p> <p>To confront the rising attrition in nursing education and other related professions, the right choice of student selection methods is vital since it is the first step in recruiting a competent student. There is therefore need to place emphasis on these student selection methods.</p>	
Keywords	Selection methods, nursing students, medical students, selection methods, Nursing student, Medical students, recruitment, student selection, admission, selection process, healthcare students, healthcare profession, admission criteria, medical school, student nursing.

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<p>Sairaanhoidon ja muiden terveydenhoitoalan oppilaitosten käyttämät opiskelijavalintamenetelmät ovat tärkeässä osassa arvioitaessa opiskelijoita jotka tulevat valmistumaan tai niitä jotka jäävät pois koulutusohjelmasta ennen valmistumista. Tämän (opinnäytetyön) tarkoitus oli kuvata tällä hetkellä käytettyjä valintamenetelmiä sairaanhoidon ja muiden terveydenhoitoalan ammattien koulutuksessa ja tunnistaa mahdollisia yhteyksiä näiden menetelmien ja opintotulosten välillä.</p> <p>Tässä opinnäytetyössä käytetyt tietokannat olivat CINAHL, PubMed, ERIC sekä käsihakuja. 17 artikkelia valittiin analysoitavaksi käyttäen Burnardin analyysimenetelmää. Seuraavaksi tulokset jaettiin kolmeen osaan, nykyiset opiskelijavalintamenetelmät sairaanhoidon koulutuksessa, nykyiset valintamenetelmät muissa terveydenhoitoalan ammateissa sekä viimeisenä yhteydet näiden valintamenetelmien ja sairaanhoidon opintotulosten välillä.</p> <p>Tämän opinnäytetyön tulokset osoittavat arvosanojen keskiarvon olevan yleisin valintamenetelmä sairaanhoidossa ja muissa terveydenhoitoalan ammateissa. Muita käsiteltyjä menetelmiä ovat muun muassa Multiple Mini Interview, (arviointikeskukset), yhdenmukaiset tentit sekä sairaanhoidossa että muissa terveydenhoitoalan ammateissa, ja henkilökohtaiset haastattelut. Yhteyksiä näiden menetelmien ja opintotulosten välillä on myös käsitelty.</p> <p>Sairaanhoidon ja muiden terveydenhoitoalan ammattien koulutuksissa keskeyttämisen lisääntyessä oikeiden valintamenetelmien käyttäminen on tärkeää sillä se on ensimmäinen vaihe menestyvien opiskelijoiden valinnassa. Tästä syystä on tarpeellista painottaa näitä opiskelijavalintamenetelmiä.</p>	
Avainsanat	Valintamenetelmät, sairaanhoidon opiskelijat, lääketieteen opiskelijat, rekrytointi, opiskelijavalinta, (sisään pääsy), valintaprosessi, terveydenhoidon opiskelijat, terveydenhoidon ammatti, (sisään pääsykriteerit), lääketieteellinen koulu

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1 Introduction

The process of selecting competent students in nursing schools is one of the most daunting tasks facing tutors and lecturing staff in nursing and other health related institutions (Rankin 2013:2718). The selection methods used in enrolling students into the nursing and other health related profession has come under increased scrutiny in recent years. This is largely due to a growing concern about the declining quality of care (Lyon, Trotter, Holt, Powell & Roe 2013:41) and high level of attrition (Rodgers, Teahouse, McCredie & Small 2013:1301). High dropout rates have been recorded in pre-registration nursing and midwifery programs as indicated in the figures of 42% in the United States, 25-30% in the United Kingdom, and 24.8% in Scottish 2007/2008 intake (Rodgers et al. 2013:1301). Furthermore, attrition of newly hired graduate nurses have been recorded up to 61% which calls for a reason to think about the nursing education (Ruth-Sahd 2014:29). These criticisms and the increased numbers of applicants to the pre-registration nursing and other health related programs have drawn more attention to the selection of students (Rankin 2013:2718).

Furthermore, the diverse nature of applicants with varying degrees or levels of academic competence has created a sense of awareness about the need to design comprehensive student selection methods that do not only measure the academic credentials of candidates but also their non-academic qualities that are fundamental in the nursing profession (Taylor, Macduff & Stephen 2014:601). The selection of nursing students and other health professions calls for students with the right values, aptitude and potential to be complete professionals. It is important to attract applicants with values and attitudes that are in line with the expectation of the clients. Thus, value-based selection methods are ideal for selecting students who are better prepared to provide 'person-centered care'. (Rankin 2013:2718.) Care and compassion are essential attributes that nursing school selectors should incorporate in the currently used selection methods (Fry, Mant, Stosiek & Emberley 2013:822).

However, it is difficult to define these complicated combinations of personal attributes and even more challenging to measure at selection level (Callwood, Allan & Courtenay 2012:1450). It is hard to establish an applicant's motivation to get into nursing programmes.

This has created a lack of consensus in the qualifications for admission into nursing programme, particularly with regards to attributes that candidates should possess (Taylor et al. 2014:1156). Although psychological profiling may contribute to an all-round approach to student selection, other approaches should be considered in making the decision. The nursing programme expectations and reality should be considered in these selection methods. (Taylor et al. 2014:1156.)

Selection methods should incorporate the elements of fairness, equality and consistency (Taylor et al. 2014:1159). They should facilitate room for appraising predictive validity in the long-run. Taylor et al. (2014:2718) point out the usefulness of value based recruitment as a vital tool for the right students to get into nursing programme. This is supported by their deduction that the right people should be selected in order to produce compassionate nurses.

Although there has been a lack of consensus on the personal attributes needed in nursing, Jane Cummings' 6c's - care, competence, compassion, commitment, communication and courage have been dominating debates about personal values (Taylor et al. 2014:1159). Additionally, motivation, confidence, resilience, being in control and cognitive skills and professional values are also desired qualities in nursing practice (Pitt, Powis, Levett-Jones & Hunter 2014:1197). To detect these attributes, selection methods should not only evaluate the academic performance of candidates but also bring out the emotional element and behaviors' influenced by personal attributes (Pitt et al. 2014:1197).

Aptitude and ability tests, group assignments, interviews, psychological appraisal, use of ethical and clinical scenarios are good methods of selecting students (Keeling 2009:61). It is important to note that these various selection methods are not precise; meaning that no specific one can satisfy or test all the competencies of students. Over the years, a lot of emphasis had been made on testing the academic aptitude (standard tests) of students at pre-entry examinations. In addition to this, interviews have been conducted by tutors to look for different competencies in applicants.

One of the functions of an efficient selection method is to produce both the academic and non-academic attributes in aspiring candidates, and which focuses on producing academically and professionally successful candidates with lowest possible rate of attrition (Timer & Clauson 2011:601).

Therefore the focus of this final project was on examining the existing student selection methods in nursing and other health related fields. The final project further extends to reviewing recent available selection methods that have been put into use in institutions of higher education.

2 Definition of vital concepts of research topic

In this section, the focus shall be to define the central concepts of the study topic and consider in detail the various student selection methods that are used in nursing education and other healthcare professions.

Selection is defined as the process of choosing somebody or something from a group of people or something. A method is a particular way of doing something. (Cambridge advanced learner's dictionary, 2003.) Student selection methods in the context of this final project refers to distinctive ways of choosing nursing student candidates from an otherwise qualified cohort that has met the minimum requirements to fill the available places of nursing and other healthcare schools. A nurse is defined as "a person who is prepared in the scientific basis of nursing and who meets certain prescribed standards of education and clinical competence" (Dorland's illustrated medical dictionary, 2012). Education is a process of issuing knowledge or training to improve or develop skills (Oxford learner's Thesaurus, 2008). Thus nursing education in the context of this Final project will refer to education and training that adheres to guidelines and standards laid down by educational and nursing associations which enables the graduate to professionally perform the functions of a nurse. Outcomes are the results or effect of an event or action (Oxford Advanced Learner's Dictionary, 2000). Educational outcomes will therefore refer to academic performance, clinical performance, attrition and student success related to the education offered in nursing and other healthcare professions. Other healthcare workers as defined by (WHO, health workers classification, 2008), are those who use well-grounded and evidence based knowledge for promotional health services, diagnosis, treating and curing of diseases and other health problems. They include physicians, physiotherapists, dentists, pharmacists, specialized medical practitioners among others (WHO, health workers classification, 2008).

3 Purpose, Aim and Research Questions

The purpose of this study was to review the currently used student selection methods in nursing education and other healthcare professions. The aim of this study is to develop the use of the different student selection methods in nursing education and to establish how recent available knowledge on these methods can be implemented to enhance nursing education.

The study questions were:

1. What are the currently used student selection methods in nursing education?
2. What are the currently used student selection methods in other healthcare professions?
3. What kind of relationships has been identified between these currently used student selection methods and education outcomes?

4 Methods

4.1 Literature review

Literature review has been used as the main method of this final project. Literature review is a methodical perceptive and demanding analysis of crucial literature on a subject (LoBiondo-Wood & Haber 2010:57). The purpose of literature review is to provide accessible overview and evidence of existing literature, identify relevant data collection patterns, and also identify the gaps on current existing literature (Polit & Beck 2012:94). Through the review of literature, a researcher can unveil consistencies and inconsistencies in a topic and be able to produce important research questions (LoBiondo-Wood & Haber 2010:59). It is notable to point out that recent studies on selection methods have been done and that the purpose of this literature review is to update data searches and to fill the gaps on this topic. Emphasis will also be placed on student selection methods in other health professions in order to relate or identify the possibility of applying them in nursing education.

4.2 Database search

Databases used in our search were CINAHL, PubMed and ERIC. Key terms used were selection methods, medical students, recruitment, student selection, admission, Selection process, healthcare students, healthcare profession, admission criteria, medical school and student nursing. These key terms were combined using the Boolean operators (appendix 2: Database search table).

Systematic database search was applied by using the same search words in different databases; ERIC, PubMed and CINAHL. The following limitations were administered to ensure only recent articles were obtained; articles published between the year 2004-2015 (In CINAHL AND PubMed), and 2006-2015 (ERIC), this was done to get a wider scope of literature since there has been little research on this topic.

The inclusion and exclusion criteria applied in the data search process are shown in table 1 below. Some articles were duplicated in different databases even after using different search words, in which case they were eliminated.

Table 1. Limitation criteria

Inclusion Criteria	Exclusion criteria
Year 2004-2015	Articles older than 12 years
Peer reviewed	Dissertations, Commentaries on journals.
All available languages	No exclusion to languages
Pre-registration Bachelor degree in nursing and other Healthcare professions.	Diploma, Graduate Degree

Database search results are illustrated in appendix 2. Relevant articles for analysis were chosen after reading and scrutinizing their titles and abstracts. The total number of articles chosen from their title and abstract was 290; 45 (CINAHL), 29(ERIC) and 216 (PubMed). Out of these 290 articles, 17 articles were selected for review based on full text and their relevance to answering the study questions. The reviewed articles originated from Canada (3), Scotland (3), United Kingdom (5), Netherlands (1), Israel (1), Denmark (1), New Zealand (1) and 2 articles covered literature from more than one country.

4.3 Data analysis

“The purpose of data analysis is to organize, provide structure to, and elicit meaning from data” (Polit & Beck 2012:556). In this final project Burnard's analysis method (BAM), was applied for data analysis. BAM aims to produce an organized and detailed recording of issues and themes in literature and to link them using a rational comprehensive category system (Burnard 1991:462). This analysis method consists of 14 stages of analysis (appendix 1: Burnard's analysis method). In the context of this final project, 7 relevant steps were applied to facilitate analysis in regard to articles selected for review. The 7 steps are (3, 4, 5, 7, 9, 13, and 14) and are illustrated in the following table 2.

Table 2. Burnard's analysis steps

Stage number	Stage of analysis by Burnard	Description
3	Articles read through	The necessary headings and categories are written down.
4	Categories noted down under higher order headings	Classified according to what study question address as shown in table of articles (appendix 3).
5	New subheadings and categories generated	Similar or duplicated headings eliminated.
7	Article reread	Reread by both writers to ensure that the core aspects of the articles are covered.
9	Data related is categorized	Data was separated into individual categories. Articles on studies about similar selection methods put together, and the methods classified together e.g. Nursing student selection methods etc.
13	Writing up	Commencement of linking data together
14	Linking of data to literature	Data linked separately or harmonized.

5 Findings

5.1 Currently used student selection methods in nursing education

In Onsite selection processes (OSSPs) context, academic qualification analysis includes Grade Point Average (GPA), essays, numerical and literature tests. The GPA is the most extensively used selection criteria in pre-nursing academic achievement (Schmidt & MacWilliams 2011:171). GPA is an academic grading tool derived from standardized tests that ranks students based on previous academic performance (Poole, Shulruf, and Rudland & Wilkinson 2012:164).

GPA has proved to be a reliable and valid selection method and predictor of nursing success (Taylor et al. 2014:1156) hence it has been used in initial stages of selection processes to scale down the number of applicants who will advance to other available methods of onsite selection processes. GPA stood out to be a strong and stable predictor of performance in nursing and other healthcare education. (Timer & Clauson 2011:602).

In using GPA as a selection criteria, nursing schools assign points or scores to indicate the minimum requirement for a candidate to be considered for selection (Shulruf, Wang, Zhao & Baker 2011:728). In a study by Timer and Clauson (2011:603), 50% of the weight of decisions as to whether an applicant would be invited to an interview or not were based on admission GPA. However, there are several loopholes in GPA as a selection method. There is a lack of uniformity in grades assigned by different institutions which do not accurately reflect the abilities of students equally. This may sideline applicants who attend institutions that have stringent grading policies. (Timer & Clauson 2011:602.)

In Finland, application for a degree program in a University of Applied Science goes through an online joint application (studyinfo.fi). As a requirement for entry into the nursing program in Finland, applicants are required to have passed the Finnish Matriculation examination (studyinfo.fi). Applicants who successfully complete vocational programme or equivalent are also eligible for admission (Talman 2014:37). Entry into nursing schools in Finland requires candidates to take an entrance examination which vary from school to school (studyinfo.fi).

Personal statements, sometimes referred to as autobiographies are necessary to enable faculty tutors to assess applicants' non-cognitive attributes such as motivation, learning style and self-evaluation (Hayes 2007:266). Academic qualifications and personal statements have been used as prerequisites in selecting candidates who advance for interview. (Taylor et al. 2014:1156).

Numeracy and literacy tests are important bearing in mind the current concern for patient safety and decision making process within the complicated roles of nurses. (Taylor et al. 2014:1158). The validity and reliability of these tests have been presumed since they are tested in the same way in all students (Taylor et al. 2014:1158).

Nursing institutions usually set minimum academic requirements for an applicant to be considered for subsequent selection process.

Interviews (personal or group) are widely used as selection methods (Rodgers et al. 2013:1302). This is largely due to the fact that candidates' personal attributes like self-efficacy and other non-academic attributes can only be revealed through interview (Schmidt and MacWilliams 2011:173). In the UK, face-to-face contact is a criteria for admission into nursing programs (Nursing Midwifery Council 2010).

Qualities assessed during interview range from candidates' problem solving skills, communication skills, and maturity (Taylor et al. 2014:1158), motivation, self-esteem, personal discipline and teamwork (Kamal 2005:108).

The length of the interview, composition, arrangement of interview stations, and grading method vary extensively (Timer and Clauson 2011:602). Group interview allows for the assessment of interpersonal skills, involve the quite participants, and reduce subjectivity (Taylor et al. 2014:1158).

Interviewers, mostly faculty members (Timer & Clauson 2011:603), are pre trained prior to interviews on interviewing and scoring to avoid bias (Kamal 2005:109). Different interviewers are engaged in a bid to acquire more objective results (Kamal 2005:109). Scoring during the interview vary according to the institutions policy. Timer and Clauson (2011:603), gave an example where interviewers independently tallied the candidates' scores and gave the arithmetic average as the final score. Despite its use in nursing and medical schools, there is weak evidence supporting the predictive power of interviews as selection methods (Rodgers et al. 2013:1302).

Different standardized tests have been used as selection tools prior to admission to nursing schools. These tests include; Scholastic Aptitude Test (SAT), Nurse Entrance Test (NET), Health Education Systems Incorporated (HESI), Test of Essential Academic Skills (TEAS), American College Test (ACT), National League for Nurses (NLN), and (Schmidt & MacWilliams 2011:172; Talman 2014:48-49.) Table 3 shows some of these standardized tests.

Table 3. Nursing Standardized Tests.

Standardized Test	Components
NET (Nursing Entrance Exam)	<ul style="list-style-type: none"> Computer based test with 6 parts- Math, comprehension reading, test taking skills, social interaction, stress level and learning style.
TEAS (Test of Essential Academic skills)	<ul style="list-style-type: none"> Multiple choice standardized test that includes, reading, mathematics, English, science and use of language
NLP PAX (National League pre-admission Exam)	<ul style="list-style-type: none"> 3 parts- mathematics, science and verbal skills
HESI (Health Education Systems Incorporated)	<ul style="list-style-type: none"> Exams used as entrance criterion and include anatomy and physiology, grammar, mathematics.
SAT (Scholastic Assessment Test)	<ul style="list-style-type: none"> 3 sections - mathematics, critical thinking and writing.
ACT (American College Test)	<ul style="list-style-type: none"> 4 parts (multiple choices). Mathematics, English level, science and reading tests.

5.2 Currently used student selection methods in other healthcare professions.

It is a complex issue to choose healthcare students who demonstrate cognitive and personal qualities required in becoming a competent and ethical professional (Till, Myford, & Dowell 2013:216). The following methods and processes have been applied in different healthcare institutions to choose the right candidates for healthcare profession: Grade Point Average (GPA), semi structured interviews, UK College Aptitude Test (UKCAT), Multiple Mini Interviews (MMIs), Modified Personal Interview (MPI), Assessment Centers (AC) and standardized tests.

Grade point average (GPA) has been relied on as an academic criteria in medical student admission, however, a mixture of grade-based admission and attribute based admission methods have been used in medical schools in an attempt to bridge the social background between doctors and their patients (O'Neill, Vonsild, Wallstedt, & Dorman 2013:558). In Netherlands for example, three selection methods are used to gain admission to medical schools. These are, GPA, National weighted lottery procedure and local institution selection procedure. (Urlings-Strop, Jager, Stijnen, & Themmen 2013:497-498.) The importance of GPA is highlighted in the fact that the high scorers (GPA greater than or equal to 8.0) get direct access to the local institutions. The remaining candidates proceed to a national weighted lottery system. They are divided according to their pre university GPA (ranging from 5.5 - 10.0) as follows; 5.5-6.5, 6.5-7.0, 7.0-7.5, and 7.5-8.0. The GPA scores are weighted as 3, 4, 6 and 9 respectively. If candidates choose to, they can also apply to the local Erasmus selection program,

which precedes the weighted lottery and involves the two steps shown in the table 3 below. (Urlings-Strop, Jager, Stijnen, & Themmen 2013:498.)

Table 4. Erasmus selection program

Local Selection procedure steps	Contents
Non-academic	-Prior job experience in healthcare, experience in managerial, organizational, sports and science. References and recommendation letters.
Academic	-Five cognitive tests on a medical topic focusing on anatomy and physiology, logical thinking, scientific reasoning, pathology and causes of diseases.

The components in the non-academic step in table 4 are independently assessed by two raters and a project leader steps in to review and correct the grades in case of difference in grading. The academic part, is scored by different raters and independently from step (non-academic) and using a different rating scale system.

Semi structured interview testing empathy, stress endurance, and future expectations have been included in some medical university admission criteria (O'Neill et al. 2013:559). An admission process to further cut down the number of applicants has been used. This process of cutting down includes among others a general test, an admission interview, and a combination of scores acquired from the application form (O'Neill et al 2013:559).

In UK, a three stage application process to a medical school requires a student to apply online through Universities and Colleges Admission Services (UCAS). In addition, a personal motivational statement and a reference from a teacher are required. (Turner & Nicholson 2011:1042.) Additionally, different aptitude tests are conjointly used with some selection methods in various universities. UK Clinical Aptitude Test (UKCAT) is one of these aptitude tests (Turner & Nicholson 2011:1043.) UKCAT is computer based assessment method used for appraising a candidate's cognitive abilities and includes a non-cognitive test (situational judgment) (Turner & Nicholson 2011:1043; Adam, Dowell & Greatrix 2011:98). Cognitive abilities tested are: quantitative reasoning, abstract reasoning, situational judgment, verbal reasoning and decision analysis skills (table 5). The interviewers are well conversant with the medical education and selection systems.

Table 5. UKCAT components

Cognitive ability	Description of what the ability assesses.
Quantitative reasoning	Numerical capability to clarify problems
Abstract reasoning	Ability to carefully evaluate and develop conclusions from abstract or inapt materials or data.
Decision analysis skills	Appraises ability to make decisions in times of uncertainty and make informed judgment with less or ambiguous information.
Verbal reasoning	Tests reading and understanding ability.
Situational judgement	Tests ability to apprehend daily situations, pointing out important factors, and applying relevant behavior to deal with these situations.

UKCAT is being used as a standardized and objective tool introduced to facilitate decision making at the invitation or offering a place of study stage or both (Adam, Dowell & Greatrix 2011:98).

The responses from the cognitive ability tests (table 5) are converted to a scaled score (300 to 900) with the total scores being 1200 to 3600 (Adam, Dowell & Greatrix 2011:98). Different medical schools use these results in four prominent methods namely; borderline, factor, threshold and rescue method. Borderline method means UKCAT scores are used as the primary determinant of who advances within a certain group. (Adam, Dowell & Greatrix 2011:98.) Factor method means a candidate's UKCAT results are added to the total scores of the subsequent selection methods in a particular medical school. Threshold method means that a certain minimum score (predetermined depending on applicants' number) must be attained in UKCAT for a candidate to advance to the next level of selection method, failure to which he is excluded. Finally, Rescue method means that UKCAT scores are used as a compensation for a lower grade in other assessment method. (Adam, Dowell & Greatrix 2011:98.)

Modified personal interviews (MPI) is a selection method that has been implemented in choosing a select group in medical school. It uses a multiple independent sampling (MIS) method where different evaluators assess the candidates' performance on independent occasions where each occasion comprises of different evaluator. (Hanson, Kulasegaram, Woods, Fechtig & Anderson 2012:1330.) The process comprises of four interview rooms each with one interviewer (trained on MPI process and interview's focus). Three of the interviews are semi structured with preplanned questions on behavioral description. The fourth interview is conducted by the faculty director. (Hanson et al. 2012:1331.) The four interviewers assess maturity, interpersonal attributes, and

communication skills. Other qualities assessed include teamwork, future expectations and vision, personal intuition and self-contemplation. Each quality is graded separately on Likert-type scale where 1 is poor and 5 is outstanding giving a possible maximum total of 20 in all interviews. Selection of the candidates is based on the overall total scores. (Hanson et al. 2012:1331–1332.)

Multiple Mini Interviews (MMIs) is a selection method tool used for evaluating and assessing candidates attributes using up to ten well-structured scenario based interviews. (Hanson et al. 2012:1330). Candidates move from one scenario to the other making it possible for the interviewers to evaluate various attributes and competence (O'Brien, Harvey, Shannon, Lewis & Valencia 2011:398). MMIs are structured to support the standards of competence (Perkins, Burton, Dray & Elcock 2013:466) which include interpersonal and communication skills, team work, professional qualities, leadership and decision making (Nursing Midwifery Council 2010).

Differences in values being sort after in various medical institutions have allowed individual institutions to custom design their own MMIs stations (O'Brien et al. 2011:398). The MMIs scenario are laid out in such a way that there is no definite answer like “yes” or “no” and the responses do not require earlier knowledge in medicine (Perkins, Burton, Dray & Elcock 2013:466.). Scaling and rating of the MMIs will be focused on the responses and behavior of candidates from the different MMIs stations, and on the specified attributes of importance in the institution. These responses are scaled against a predetermined scale value for the final score. (Perkins et al. 2013:466.) Interviewers may range from medical students, faculty members, unclassified, community members and even graduates (Till et al. 2013). MMIs are used in selection of Healthcare students to bolster interview by highlighting a more reliable assessment method of candidates' strengths and weaknesses (Till et al. 2013:217). Arrangement of the interview stations in MMI brings out the unpredictability element, and consequently makes it difficult for the students to rehearse earlier for the answers (Perkins et al 2013:466). Research has been able to match MMIs performance to applicants' attributes (Taylor et al. 2013:1157).

Choosing healthcare applicants through Assessment Centers (AC) is a distinctive student selection method that has been operational. The fundamentals of an Assessment Center include trained examiners, behavioral simulation tests, analysis and assessment of required or expected qualifications, diverse methods of evaluation and multiple

examiners (Ziv, Rubin, Moshinsky, Gafni, Kotler, Dagan Lichtenberg, Mekori & Mittelman 2008:991). In their study, Ziv et al. (2008:991-998) describes Assessment Centers that are divided into three sections meant to assess applicant's personal and interpersonal attributes. The three sections (behavioral, judgmental/decision making questionnaire and autobiographical questionnaire), their contents, and steps involved during the selection process are displayed in table 6.

Table 6. Assessment Centre

Assessment section and attributes assessed.	Steps involved and scoring method
Behavioral station (interpersonal communication, handling stress, being initiative and responsible.	<ol style="list-style-type: none"> 1. Challenging situations with simulated real-life patients. 2. Interview using structured form connected to candidate's behavior on the situation above (1). 3. Personal interview on medical career and its up-to-date policies. 4. Group interview 5. scale of 1-6 on each quality
Judgmental and decision making questionnaires (assessing candidate's viewpoint on moral involvement)	<ol style="list-style-type: none"> 1. Writing three essays on actual life dilemmas. 2. Decide on the dilemmas and give justification 3. Each argument = 2 points based on its expression of both professional and moral approach.
Biographical Questionnaire (Past experiences and emotional alertness)	<ul style="list-style-type: none"> • Ten open ended questions on earlier experience. • Ten open ended questions on emotional alertness and experience in handling emotional circumstances. • Scored 1-5 as per defined score chart focusing on honesty, credibility, persistence, self-assessment and intercommunication

It is worthwhile to note that most medical institutions have employed use of specific standardized academic tests in conjunction with their main student selection methods in order to segregate higher performers, moderate external factors effects, improve transparency and higher participation in entrance exams, and to clearly mirror a candidate's current abilities and skills (Turner & Nicholson, 2011:1042-1043). The following Table 7 illustrates some of the standardized tests used in medical institutions in different parts of the world.

Table 7. Standardized preadmission tests in Healthcare professions.

Standardized Test	Country	What it tests
Medical College Admission Test (MCAT)	USA, Canada	Intellectual abilities
Medical School Admission (MSAT) Graduate Australian Medical School Admission Test (GAMSAT)	Australia Australia	Appraises candidate's analytical skills and inborn knowledge.
Undergraduate Medicine and Health Sciences Admission Test (UMAT)	Australia	Cognitive skills and empathy skills
Biomedical Admission Test (BMAT)	UK	Subject specific medicine test and also tests Innate intelligence of candidates.
United Kingdom College Admission Test (UKCAT)	UK	Situational judgement, verbal rationale, quantitative analysis, critical thinking.

5.3 Currently used student selection methods and their relation to education outcomes.

5.3.1 General description of GPA and education outcomes

It is important to mention that there is scant statistical data about correlation between admission GPA and education outcomes, however, Timer and Clauson (2011:602) reported that students with higher GPA tend to perform well in clinical settings and that earlier academic performance is a good predictor of subsequent academic performances (Wilkinson, Zhang, Byrne, Luke, Ozolins, Parker & Peterson 2008:352). In a study by Timer and Clauson (2011:602), a positive relationship was established between admission GPA and Nursing grades, and admission GPA and graduation GPA (correlation 0.4 and 0.36 respectively). Due to nursing courses reliance on science background, science GPA (biology, physiology, anatomy), is reported to be a consistent predictor of success in nursing (Timer & Clauson 2011:602). However Schmidt and MacWilliams (2011:172) contradicted this by stating that science grades were not predictive of neither graduation nor passing NCLEX in the United States.

Table 8. Student selection method and their relationship to education outcomes

Selection Method	Relationship to education outcomes	Selection method vs education relationship
Grade Point Average	<ul style="list-style-type: none"> • UGPA and nursing school grades ($r=0.4$, $p<0.05$). • UGPA and graduating GPA ($r=0.36$, $p<0.05$) • UGPA and later academic performance (r 0.40-0.50, $p<0.05$) 	+ + +
Medical College Admission Test (MCAT)	<ul style="list-style-type: none"> • later pre-clinical performance (r 0.31-0.54) 	+
Multiple Mini Interviews (MMIs)	<ul style="list-style-type: none"> • Good clinical decision ($p<0.05$). 	+
Personal/Motivational statements	<ul style="list-style-type: none"> • Low predictive value for success. (1/20) statements contain plagiarism. 	-
Pre-admission interviews	<ul style="list-style-type: none"> • Attrition rate of students dropped by 10% in the presence of interview 	+

UGPA - Undergraduate Grade Point Average

r - Correlation

p - Pearson's correlation

+ Positive education outcome relationship

- Negative education outcome relationship

Shulruf et al. (2011) reporting about New Zealand based studies noted a fairly positive relationship between entry criteria (GPA and interview) and first year achievement in nursing programs (correlation 0.32). Undergraduate GPA has been reported to have a positive predictive validity to later academic performance (Strop-Urlings 2013:497). However, the use of GPA as a selection method has its limitations in predicting student performance. A lack of homogeneous adjusted GPAs from various institutions is a reason that leads to bias with regard to students who attend institutions with strict grading system. (Timer & Clauson 2011:602.)

5.3.2 Other student selection methods and their relationship with educational outcome

The use of aptitude tests and standardized tests as additional selection methods have been geared towards increasing transparency and help participation especially in medical schools, and are being increasingly used as pre-admission criteria in nursing schools (Turner & Nicholson 2010:1042; Schmidt & McWilliams 2011:172).

In their research, Strop-Urlings et al. (2013:497) noted an acceptable positive relationship between Medical College Admission Test (MCAT) and GPAs of third year medical students with later pre-clinical performance. However, MCAT has a relatively low positive relationship to clinical practice in their final year. (Strop-Urlings 2013:497). Aptitude tests are highly regarded because they assess candidate's aptitude for studying in higher institution of learning, minimize the effects of external environmental aspects and gradually bring out and measure a candidate's capability (Turner & Nicholson 2010:1042).

Multiple Mini Interviews (MMIs) as earlier discussed involves candidates rotating over a series of scenario-based tasks or questions as in Objective Structured Clinical Examinations (OSCE) (O'Brien et.al 2011:398). Strop-Urlings et al. (2013:497) noted a positive relationship between MMIs and the clinical decision making section of the Canadian pre-licensure exam. In addition to this predictive capability, MMIs are capable of assessing several distinct non-cognitive domains, and are flexible tools such that they allow institutions to design their own MMI stations which reflects the values of their schools.

Personal statements are used as part of Universities and College Admission Service (UCAS) in medical schools application. Although the UCAS is a well-structured process, it could have an element of bias and has a weak predictive value for success. Furthermore, it has been reported that one in twenty UCAS applications personal statements has some elements of plagiarism from available online templates. (Turner & Nicholson 2010:1042.)

Attrition rates declined where pre-admission interview were conducted as reported by Schmidt and Macwilliams (2011:173). However, interviews' dependability as a selection method in terms of consistency in decision making is questionable as candidates will most likely say what the interviewer wants to hear and in such context assessing the candidate's performance against a pre-set criterion seems subjective. Moreover, motivation, professional attributes and retention and student success are indeterminate during the interviews. (Rodgers et al. 2014:1302–1303.)

6 Reliability and Validity

Reliability relates to the trustworthiness of the data produced and procedures exercised in a research. Thus it should illustrate “...the extent the results of a study or a measure are repeatable in different circumstances”. (Roberts, Priest & Traynor 2006:43.) Data has been collected in a consistent manner avoiding any inappropriate variations that may intentionally alter the nature or content of the data (Long & Johnson 2000:31).

“Validity is assessed in terms of how well the research tools measure the phenomenon under investigation” (Roberts, Priest & Traynor 2006:44). To avoid the drawbacks originating from the use of a singular source, triangulation has been applied by using multiple data sources in the search for relevant literature to ensure comprehensiveness, consistency and the strength of the study (Long & Johnson 2000:34).

CINAHL, PubMed, and ERIC considered to be credible and reliable databases in nursing and medical fields were used. The research questions were also used in assessing the contents of the research articles and only the applicable articles were chosen. The articles reviewed described selection methods in different countries, but the interpretation of the results was done jointly to avoid researcher bias a likely problem arising from interpretation based on personal viewpoints (Roberts, Priest & Traynor, 2006:44).

7 Discussion

The main purpose of this study was to review the student selection methods used in nursing education and other healthcare professions and to explore the existence of relationships between these methods and education outcomes. Using CINAHL, PubMed and ERIC databases, search terms as indicated in the abstract were used to find articles related to the study questions. The articles were analyzed by applying Burnards’ analysis steps (table 2). Articles were re-read and information derived was classified according to how they answered the following study questions; currently used student selection methods in nursing, currently used student selection methods in other healthcare professions, and the relationship of these methods to education outcomes.

Literature analysis in this final project places more emphasis on student admission and selection methods. This is largely due to chronic shortage of competent nurses (high attrition) that has long plagued the health care systems around the world. Ruth-Sahd (2013:29) attributed this to a continuous education-practice gap for far too long.

High attrition and criticisms about poor quality of care has spurred nursing and other healthcare institutions to focus on selecting students rather than mass recruitment. As a result, nursing schools use a combination of selection methods that are designed to measure candidates' academic and non-academic qualities that are fundamental in clinical settings. The study revealed strong emphasis on identification of academic qualities across all nursing and other healthcare institutions. This is geared towards selecting students who possess high academic qualities or those who have the potential to develop these qualities during their education and training. The GPA has been found to be the most widely used academic criteria for pre-registration nursing and medical applicants. Its high predictive validity in terms of academic and clinical success has been widely reported. In other words, the GPA as a selection method has positive correlation to education outcomes. Other academic selection methods in nursing and medical schools include the use of standardized tests scores and entrance examinations.

The selection of nursing students with the required non-academic qualities is equally important if the nursing sector is to achieve what Rankin (2013:2718) referred to as value-based care. Qualities like compassion, motivation, teamwork and emotional support for patients are some of the important ingredients that a competent nurse is expected to have. The successful selection of students who show sound academic qualities as well as non-academic qualities may lead to a holistic approach to patient care. Non-academic selection methods that both nursing and medical schools use include, interviews, personal statements, assessment centers and multiple-mini interviews. Although majority of research done on this topic does seem to indicate that these methods do not show strong correlation to nursing and medical success, they are increasingly being used as important tools to mark out useful non-cognitive qualities of prospective healthcare professionals.

It is important to underscore that it is a challenging task to determine the most efficient set of selection methods to select students due to a variety of reasons. There is limited research done on the use of student selection methods in nursing and other healthcare profession which implies that there is a lack of sufficient evidenced-based results showing the validity and reliability of these methods in healthcare. Secondly, there is a lack of concrete evaluation of the reliability of the selection methods. Most of these methods have been the traditional way of selecting students into nursing and medical training, however, as mentioned earlier, their effectiveness is not well known.

In order to begin addressing high attrition rates and poor quality care due to incompetent personnel, more effort needs to be done to establish the effectiveness of the selection methods. There is also a lack of consistency in the application of student selection methods across nursing and medical schools. Different schools set different standards during selection process which invariably leads to differences in the quality of students selected.

7.1 Main Findings

The recurrent theme in the literature review of this final project has been the use of Grade Point Average (GPA) as a key criterion for student selection in nursing schools and other healthcare professions.

Previous academic achievement measured in terms of the GPA has been the predominant entry requirement. GPA as reported by Timer & Clauson (2010:602) is not only a good predictor of performance but also a stable selection method in nursing and other healthcare programmes. However, its relationship with clinical performance is inconclusive. (Timer & Clauson 2010:602.)

The use of pre-admission standardized test scores has been highlighted as a common academic criterion that many higher institutes of learning require (Schmidt et. al 2011:172). These standardized tests in nursing education (table 3) and in other healthcare professions (table 7) are mainly used in student selection criterion auxiliary to other selection methods. Standardized tests facilitate the appraisal of cognitive skills (mathematics, science etc.) and non-cognitive qualities (critical thinking among others) required in healthcare professions. Although not all higher learning institution require these standardized tests as part of their entrance criteria, the tests are considered a compulsory minimum requirement to qualify for application process in some institutions (example UKCAT in UK)(Adam et al.2011:98).

The review of literature in this final project has also shown several close parallels between nursing and healthcare student selection methods and their relationship with education outcomes. Close collaboration for the improvement of the quality of students selected in nursing and other health care professions has been suggested.

In addition to academic entry requirements, both nursing and other healthcare schools use several non-cognitive selection methods to select the most suitable applicants.

O'Brien et al. (2011:397), points out personal interview as being the traditional method for assessing non-cognitive qualities in the UK medical schools. However, personal interview has been widely perceived to lack depth in terms of adequately assessing applicants' non-cognitive attributes such as communication and interpersonal skills. Consequently, to encounter this dilemma, Multiple Mini Interviews (MMIs) has been employed as a new approach of assessing non-cognitive variables.

To assess the relationship between specific selection methods and their educational outcomes, different studies have considered diverse variables (table 8). Undergraduate Grade Point Average (GPA) has consistently been identified to show a positive relationship with subsequent academic performance, grades acquired while studying nursing and GPA at graduation. On the other hand, the use of pre admission interview has resulted to a decline in the number of dropouts in nursing programme hence an indication of a positive trend which helps in combating the attrition problem in healthcare. Medical College Admission Test (MCAT) a highly used standardized test has shown a relatively positive relationship with preclinical performance while Multiple Mini Interview (MMI) indicated a positive relationship with good clinical decision making. Motivational statements however were found to contain plagiarism and hence not depicting a complete picture of students' attributes.

7.2 Implications for Nursing Education

The purpose of selection methods should not be just for admission purpose, but rather, to ensure that the right candidates are chosen to successfully complete their nursing programs in order to reduce attrition rates. The recent attrition rates recorded by Rodgers et al. (2013:1301) of 42% in the United States, 25-30% in the United Kingdom, and 24.8% in Scottish 2007/2008 intake paints a dire situation in the nursing and other healthcare fields. Thus application and use of the right selection methods in nursing programs is of core importance in selecting aspiring candidates. Nursing education is evolving and changing overtime and there is need for nursing programmes to reevaluate the student selection methods and the requirements needed for admission to ensure a refined and efficient combination of student selection methods.

The existence of close similarities between nursing and the medical profession, calls for collaboration in terms of sharing knowledge to improve their respective professions. These collaborations would allow nursing students to adapt and learn in advance the

roles required in interdisciplinary or teamwork with other healthcare professions. As Ruth-Sahd (2013:31–32) points out, there is need for nursing and medical education to have a close partnership in terms of adopting useful issues in student selection methods. Nursing schools should also embrace new admission or improved admission methods from other healthcare related professions due to the diverse nature of applicants and simultaneously maintain consistency in the application of student selection methods.

Nursing schools and other related healthcare institutions should move away from simply adhering to the traditional selection of students as a matter of protocol and base their selection criteria on proven evidence based student selection methods.

7.3 Implication for further research

The literature reviewed has highlighted the limited research done on student selection methods in nursing and other healthcare profession. The current selection methods should evolve to keep pace with the realities facing the nursing sector so as to recruit students who have adequate potentials to excel in their studies. Demographic factors that affect student selection should be kept in mind and be well defined to facilitate consistency in student selection methods. Future research on student selection in nursing school should be directed towards evaluating and improving different selection methods. Although is a challenging task, it is important to define and measure or at least have an idea about nursing students' level of motivation for the profession. (Talaman 2014:4.)

Although predictive validity of student selection methods such as Multiple Mini interview (MMI), Assessment centers (AC), and United Kingdom College Assessment Test (UKCAT) have been covered in this literature review, their long term predictive reliability calls for further research. In the context of Multiple Mini Interview, customization of the stations used to meet the values needed in a particular institution may eventually lead to inconsistency in the attributes of the nursing students. There is need to identify similar stations that would be widely used across nursing programmes. The preadmission standardized tests predictive validity have also not been covered comprehensively and needs further research.

7.4 Ethical Considerations

“Nursing research requires not only expertise and diligence but also honesty and integrity.” (Grove, Burns & Gray 2013:159). In a bid to follow this statement, the work of other researchers and their accomplishments was appreciated and recognized appropriately by duly recognizing and relevantly referencing their articles in this final project. Furthermore, we presented the contents of the articles without changing the initial intended content meaning. Integrity, meticulousness and both accuracy in recording and conducting research were followed as stipulated by RCR guidelines (Finnish advisory board on research integrity 2012).

8 Conclusion

The existence of widespread shortage of nurses has led nursing schools and other healthcare institutions rethinking their admission methods. A lot of literature points to the fact that lack of a realistic understanding of what nursing education entails lead students to make wrong career choices, thus the high dropout rate. This viewpoint is backed by a review of students’ attrition at University Campus Suffolk by Hughes (2013:44) that students withdrew from midwifery programs for a variety of reasons which include financial, personal, lack of preparedness, lack of interest in the course and lack of integration.

Additionally, the process of selecting students who are capable of going through the rigors of nursing education has been problematic and challenging for staff and faculty members. Selectors are faced with the conscientious task of identifying students/applicants who possess sound academic and non-academic qualities that nurses should have. Nursing schools are increasingly being forced to operate under limited resources forcing them to use less resource intensive methods to recruit students (for example, GPAs and standard tests as opposed to interviews). Consequently, this could lead to inadequate screening of nursing applicants because some of the non-academic selection methods require more resources. The GPA appears to be the most recurrent theme of selection methods in this study and its strong predictive validity has been widely reported. Other selection methods highlighted in this final project are traditional (personal and group) interviews, multiple mini interviews, assessment centers and personal statements.

As mentioned earlier, these selection methods still require improving. It is therefore necessary for more studies to be conducted to evaluate the effectiveness and weaknesses of selection methods so that valuable information can be available to nursing and medical schools to reform and upgrade their admission process.

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Burnard's Analysis Method

Burnard's stages of Analysis		
Stage number	Stage of Analysis by Burnard	Description
1	Notes after interview	Memos or field notes to record ideas as data is collected
2	Transcripts read through	Notes made on general themes to immerse researcher in data
3	Transcripts read through	As many headings/categories as necessary written down to describe all content (excluding 'dross'). Also known as open coding
4	Categories grouped under higher order headings	Categories collapsed into broader categories
5	New list of categories and subheadings worked through	Any repetitious/similar headings removed
6	2 colleagues generate categories independently then all 3 lists discussed	Member checking - adjustments made necessary
7	Transcripts reread	Ensuring final categories cover all aspects of interviews
8	Transcripts worked through and coded	coding data
9	Data relating to each category/code allocated together	Separation of data into individual categories/codes
10	Data pasted onto sheets with appropriate headings/subheadings.	Separate sheets for each category
11	Selected respondents asked to check appropriateness of category system	Member checking with interviewees
12	Filing of sections with complete interview transcripts	Collection of sections allows checking during writing up
13	Writing up	Commentary to link examples of data together
14	Linking of data to literature	Either as separate sections or integrated

Database search table

Data search table						
Search words	CINAHL 2004-2015,(12.2.2015) Peer reviewed		ERIC 2006-2015, 14.2.2015,peer reviewed		PubMed 2004-2015, (13.2.2015)	
	Hits	Chosen based on topic's relevance.	Hits	Chosen based on topic's relevance.	Hits	Chosen based on topic's relevance.
"Recruitment" AND "Nursing students"	210	11	5	0	208	22
"Selection" AND "Nursing students"	87	13	7	3	249	20
"Student selection" AND "Nursing education"	24	2	0	0	9	6
"Admission" AND "Nursing Education"	55	1	9	3	352	31
"Selection methods" AND "Medical students"	4	1	3	0	8	2
"Medical students" AND "Admission criteria"	1	1	12	7	390	52
"Admission criteria" AND "Nursing"	26	5	4	2	279	34
"Selection process" AND "Student nurses"	3	1	0	0	2	1
"Admission" AND "Nursing students"	42	8	6	4	190	35

"Admission" AND "Healthcare students"	0	0	0	0	3	0
"Admission criteria" AND "Medical School"	4	1	16	10	367	13
"selection" AND "students nursing"	171	12	7	1	195	6
"admission criteria" AND "students nursing"	13	1	4	0	130	11
"Admission" AND "students nursing"	76	12	25	1	167	3
"recruitment" AND "students nursing"	383	1	14	0	152	0

Table of Articles

Author(s) Title of article	Main purpose of the article	Participants	Methodology, data collection, Analysis	Main Findings
Taylor, R., Macduff, C. and Stephen, A. (2014) A national study of selection processes for student and midwives. <i>Nurse Education Today</i> , 34, 1155-1160.	Explore existing models of face-to-face interview. Explore efficacy, reliability and validity of face-to-face interview, and its 'relation to selection processes as selection tools for nursing and midwives recruitment.	7 higher institutions of higher education in Scotland with students, administration and clinical interviews participating.	Scoping questionnaire, interviews. Analysis was consistency with the data collection approaches.	<p><u>Answers study question 1</u></p> <ul style="list-style-type: none"> • Selection process stages and methods using Onsite selection processes (OSSPs). • Academic qualification (Grade Point Average). • Emotional intelligence test. • Multiple Mini Interviews (MMIs). • Personal statements and motivational letters. • Literacy and numerical tests. • Personal and group interviews. • Service users, faculty staff, and others in selection methods.
Rodgers, S., Stenhouse, R., McCreddie, M. and Small, P. (2013) Recruitment, selection and retention of nursing and midwifery students in Scottish. <i>Nurse Education Today</i> , 33, 1301-1310.	Identification of best practices in recruitment, selection and retention across Scottish universities providing pre-registration programmes.	10 universities	18 interviews, semi structured face to face and telephone interviews. Evident based literature collected and subjected to thematic analysis.	<p><u>Answers study question 1 and 3</u></p> <ul style="list-style-type: none"> • Face to face interaction as a requirement in entry to nursing programmes in UK. • Interviews • Grade Point Average (GPA) • Personal statements • Service users involvement in selection of potential student nurses <p><u>Outcomes</u></p> <ul style="list-style-type: none"> • Interview has poor predictive reliability • Age and written materials in interview are best success predictors for year one. • GPA best reliable success predictor in nursing and other healthcare professions.
Timer, J. and Clauson M. (2011) The use of selective admission tools to predict students' success in an advanced standing baccalaureate nursing program. <i>Nurse Education Today</i> , 31, 601-606.	Does the admission process give reliable, valid and fair method of predicting students' succession in regard to undergraduate academic and clinical courses and also the GPA?	249 students admitted to a Canadian accelerated baccalaureate nursing program over a 4 year study period.	Arithmetic mean grade for 6 nursing courses and students GPA at graduation were the outcome measures used.	<ul style="list-style-type: none"> • Assessment of both cognitive and non-cognitive qualities in a selection criteria. • Prior academic achievement assessment in selection process (through GPA) • Admission interview • Personal statements

Schmidt, B. and MacWilliams, B. (2011) Admission Criteria for Undergraduate Nursing Programs. <i>Nurse Educator</i> , 36(4), 171-174.	A systematic review of mostly used admission criteria for prelicensure nursing programs and the relationship between these criteria and success in nursing undergraduate programs.	Review from different articles.	A systematic review about criteria for admission in nursing programme.	<p><u>Answers study question 1 and 3</u></p> <ul style="list-style-type: none"> • Use of Overall Grade Point Average (GPA) as an admission criteria. • Standardized tests used in pre admission to nursing programs. • Personal interviews. • Motivational essays. • <u>Nursing education outcomes</u> • GPA of courses presumed to be essential in Nursing (English, psychology and sciences) • Achievement in sciences (biology, psychology, pathophysiology) in predicting success in nursing programs. • Prior experience in healthcare, volunteerism and other services as a selection method tool.
O'Neill, L., Vonsild, M.C., Wallstedt, B., and Dornan, T. (2013) Admission criteria and diversity in medical school. <i>Medical Education</i> , 47, 557-561.	Comparison of two selection methods (attribute based) and (academic based) in order to see whether either of the selection methods have any influence on the diversity of the medical student population in the University of Southern Denmark.	The study sample in all medical students admitted between the years 2002-2007; a total of 1074 students.	An observational and cross-sectional study was designed to examine student information retrieved from the university databases. Academic based selection and attribute based selection methods were compared on the same variables (age, admission type, gender and pre-admission examination type) that data collection was based on	<ul style="list-style-type: none"> • Outlined the use of grade-based and attribute based admission methods. • Weak correlation of .14 found between the four identified variables in the study (admission type, age, GPA at pre-admission). • No difference between the admission groups in any of the social variable (ethnic origin, education, parenthood, family type, parent on benefit) which have been previously associated with low educational attainment in Denmark.
Hayes, J.L (2007) Recruitment Strategies for Baccalaureate Nursing Students in Ontario. <i>Journal of Nursing Education</i> , 46 (6) 261-266	A qualitative descriptive study designed to explore the nature of recruitment practices for basic baccalaureate degree nursing programs in Ontario.	15 interviews of nursing faculty and institutional liaison officers, and relevant database materials.	Research undertaken as a case study, interviews and online materials were obtained.	<p><u>Answers study question 1</u></p> <ul style="list-style-type: none"> • "Information Fairs" organized to give information (and answer questions) to the potential applicants. • Promotion of Nursing institution by organizing visits to secondary schools • On-campus tours and recruitment events to

(Continuation) Hayes, J.L. (2007) Recruitment Strategies for Baccalaureate Nursing Students in Ontario. <i>Journal of Nursing Education</i> , 46 (6) 261-266				<p>give prospective applicants more information and idea of the institution. (continuation)</p> <ul style="list-style-type: none"> • Two recruitment strategies (High school leavers and those with other experience). • Minimum grade set as a requirement in academic achievement. • Supplementary selection methods such as Interview, reference letters, autobiographies (personal statements) are necessary.
Till, H., Myford, C. and Dowell J. (2013) Improving Student Selection Using Multiple Mini-Interviews With Multifaceted Rasch Modelling. <i>Academic Medicine</i> 88(2), 216-223.	Multiple mini Interview data reported from University of Dundee Medical School. Does the examiners show differences in their grading system?	452 candidates from Dundee University.	Rotational through 10 stations that assessed 6 non-cognitive attributes; each station one examiner. Facets software used for analysis.	<p><u>Answers study question 2</u></p> <ul style="list-style-type: none"> • Multiple Mini Interviews (MMIs). • Use of Multifaceted Rasch Measurement (MFRM) to analyze grading data
Adam, J., Dowell, J. and Greatrix, R. Use of UKCAT scores in student selection by UK medical schools 11, 98.	United Kingdom Clinical Aptitude Test (UKCAT) use in decision making while selecting medical students.	26 medical schools and 9 dental schools (dental school results not reported in this study).	Telephone interviews using pre-circulated structure questionnaire.	<p><u>Answers study question 2 and 3</u></p> <ul style="list-style-type: none"> • UKCAT is a standardized computer-based aptitude test used as a selection tool for medical student applicants. • • UKCAT Tests cognitive reasoning, situational judgment, decision making skills and hypothetical reasoning. • Institutions use UKCAT tests results in four different ways; borderline, factor method, threshold method and rescue method depending on the policy of institution. <p><u>Outcomes of the method in terms of success</u></p> <ul style="list-style-type: none"> • The research for predictive validity of UKCAT's cognitive validity is still underway.
Ruth-Sahd, L.A. (2013) A Call to Action: Nursing Education Must Embrace Change and Move Forward. <i>Dimension of Critical Care Nursing</i> , 33(1) 28-30.	A review of the challenges facing nursing and medical curricular including admission requirements; suggestions about improving admission methods and teaching strategies.	Not applicable	Literature review of selection methods in medical and nursing schools. In addition to this, the author also examined the curricula of both nursing and medical schools.	<p><u>Answers study question 1</u></p> <ul style="list-style-type: none"> • A minimum GPA requirement for entry to nursing school • Scholastic Achievement Test (SAT) • American College Test (ACT) • Recommendation letters

<p>(Continuation)</p> <p>Ruth-Sahd, L.A. (2013) A Call to Action: Nursing Education Must Embrace Change and Move Forward. <i>Dimension of Critical Care Nursing</i>, 33(1) 28-30.</p>				<ul style="list-style-type: none"> Written essays <p>(Continuation) <u>Proposed new methods to include in selection</u></p> <ul style="list-style-type: none"> Completion of 30-50 hours of career shadowing before application to nursing programme. Inclusion of Nursing College Admission Test (NCAT) comparable to Medical College Admission Test (MCAT) in admission test for prospective nursing students.
<p>Ziv, A., Rubin, O., Moshinsky, A., Gafni, N., Kotler, M., Dagan, Y., Lichtenberg, D., Mekori, Y.A. and Mittelman, M. (2008) MOR: a simulation-based assessment center for evaluating the personal and interpersonal qualities of medical school candidates. <i>Medical Education</i>, 42, 991-998.</p>	<p>Description of 'MOR' an acronym for "selection for medicine" an assessment tool for medical school through an Assessment center.</p>	<p>283 and 280 candidates in the years 2004 and 2005</p>	<p>Simulation based assessment testing different attributes in rooms with audio visual facilities and mirrors for observation</p>	<p><u>Answers study question 2 and 3</u></p> <ul style="list-style-type: none"> An assessment Centre (MOR) used as a selection tool, Consists of three test stations namely; behavioral (six individual stations and two group stations), biographical questionnaires (open ended questions), and judgmental and decision making station (include writing three essays). Overall scoring (100 points divided into 60 for behavioral, and 20 each for the two remaining stations). <p><u>Outcomes/Changes</u></p> <ul style="list-style-type: none"> 20% change in the chosen student cohort after application of MOR. Moderate correlation found between MOR segments an indication of the similarities of the non-cognitive qualities they measured.
<p>O'Brien, A., Harvey, J., Shannon, M., Lewis, K., and Valencia, O. (2011) A Comparison of multiple mini-interviews and structured interviews in a UK setting. <i>Medical Teacher</i>, 33, 397-402.</p>	<p>To evaluate the potential reliability, feasibility and acceptability of MMI and compare it in terms of its validity to standard interviews.</p>	<p>Two pools of volunteers representing 26 for the 5 year (MBBS 5) AND 21 for the 4 year undergraduate medical programs (MBBS 4) at St George's University of London.</p>	<p>MMIs stations were designed to give the two sets of volunteers' different tasks that tests both their academic and non-academic qualities. Standard interview also used as a test.</p>	<ul style="list-style-type: none"> No major difference in terms of performance was detected between the MMI and SI for both 5 year and 4 year students. However, the 5th year students performed better on the MMI.
<p>Urlings-Strop, L.C., Stegers-Jagers, K.M., Stijnen, T. and Themmen A.P.N. (2013) Aca-</p>	<p>How academic and non-academic selection steps contribute to overall student perfor-</p>	<p>Students from four consecutive cohorts admitted to medical colleges through local selection</p>	<p>3 selection procedures applied.</p>	<ul style="list-style-type: none"> Mentions relationships between selection methods (GPA, MMI, and MCAT) and education outcomes.

ademic and non-academic selection criteria. Medical Teacher, 35, 497-1047.	mance.	procedures and through lottery weighted procedure.		<ul style="list-style-type: none"> GPA and admission process highlighted.
Turner, R. and Nicholson, S. (2011) <i>Can the UK Clinical Aptitude Test (UKCAT) select suitable candidates for interview?</i> Medical Education, 45, 1041-1047.	Determination of UKCAT is suitability to select suitable applicants for interview	812 and 200 students with high and low UKCAT scores respectively	Relationships existing between interviews and UKCAT were analyzed using correlation coefficients.	<p><u>Answers study question 2</u></p> <ul style="list-style-type: none"> The UK medical students' application process illustrated which include; Personal statements, prior academic performances, references. Aptitude and standardized tests advancement. UKCAT expanded and explained.
Hanson, M.D., Kulasegaram, K.M., Woods, N.M., Fechtig, L. and Anderson, G. (2012) Modified Personal Interviews: Resurrecting Reliable Personal Interviews for Admissions? <i>Academic Medicine</i> , 87(10) 1330-1334.	Improvement of personal interviews using multiple independent sampling (MIS).	University of Toronto students.	Participation of candidates in four sections of approximately 11 minutes independent modified personal interviews with different examiners.	<p><u>Answers study question 2</u></p> <ul style="list-style-type: none"> Use of interview mentioned as a tradition method Improvement of interview through multiple independent sampling method. Multiple Mini Interviews mentioned as most popular method of selecting students. Written statements as part of the selection method.
Hughes, H.A. (2013) Factors influencing attrition rates in midwifery students. <i>Nursing Standard</i> , 27, 26, 42-48	A review conducted to examine the reasons for student attrition in pre-registration midwifery programs at Suffolk university and to suggest possible strategies to implement during selection of applicants in order to reduce attrition.	All students who dropped out from midwifery program over a five year period (2006-2011) were studied	Review of student records to explore the reasons midwifery students give for their withdrawal from the midwifery program.	<ul style="list-style-type: none"> The key finding from the review of student records points to poor or wrong career choice as the main reason for voluntary withdrawal from Midwifery programs at the University Campus Suffolk.
Shulruf,B., Wang,Y.G., Zhao,Y.J., Baker, H. (2011) Rethinking the admission criteria to nursing school. <i>Nurse Education Today</i> , 31,727–732.	The study focused on and highlighted the predictive value of Undergraduate Grade Point Average as the best predictors for student achievements in their first year in undergraduate program.	The study includes a cohort of 134 students in the undergraduate nursing program in the University of Auckland.	Data from a cohort of 134 students retrieved from the university database. Descriptive statistical analysis was used to study the sample and a linear regression model applied to identify the factors that best predicts freshmen' GPA in nursing school.	<p><u>Answers study question 1 and 3</u></p> <ul style="list-style-type: none"> The best predictor for the first year GPA is the National Certificate of Educational Achievement Grade Point Average. (NCEAGPA). The next best predictor is the university admission ranking scores. The NCEA is the secondary school assessment system in New Zealand.

Perkins, A., Burton, L., Dray, B. and Elcock, K. (2013) Evaluation of a multiple-mini-interview protocol used as a selection tool for entry to an undergraduate nursing programme. <i>Nurse Education Today</i> , 33, 465-469.	How effective is Multiple Mini Interviews as a selection tool for entry into a nursing programme.	Assessment of St. George's university 890 applicants and 82 Interviewers.	Questionnaires used to assess the concept.	<u>Answers study question 2</u> <ul style="list-style-type: none"> Multiple Mini Interview as selection method discussed